OLD PEOPLE AND THEIR HEALTH*

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May I first of all express my deep appreciation of the very great honour that you have conferred on me by this invitation to travel to South Africa to speak to you today. It is both an honour and a responsibility, and the mere fact that you are today devoting a plenary session to the subject of Old Age is an indication of its importance. When the British Medical Association held a combined meeting with the Canadian Medical Association at Edinburgh in 1959, Old Age was then given a prominent place in the programme, and in fact 'the problems of old age', as we are apt to call them, are becoming widespread through the world.

We must, however, be careful about the use of this word 'problem', for it represents one of the two prevailing misconceptions concerning old age — I shall refer to the other at the end of this address. I have already said elsewhere that 'it is grossly unfair to the old people themselves to regard their age purely as a problem for society. To do so would be to forget their own massive contribution to the maintenance of our social structure. To make but two points: in general they make every effort to preserve their own independence, while the contribution made by the older woman to the domestic stability of the community needs only to be stated to be realized'.[1] It is broadly true that, until the middle seventies are reached, most individuals tend to be donors rather than debtors to society.

Increase in Proportion of Aged

The challenge to society presented by ageing of the population occurs wherever mankind chooses to make use of the profound control of his environment inherent in modern medicine and public health. One immediate effect of modern public health is the reduction in mortality rates, which leads to a great improvement in the expectation of life, and so to an increase in the number of those reaching old age. It is important to remember that these population changes are progressive in more than one sense. With the spread of knowledge more countries are concerned, and within those already affected the impact of age increases. In a population whose numbers are freely exposed to natural denudation, the proportion of old people (i.e. beyond 65) is low. Thus, in Ceylon in 1881 the proportion of elderly people was only 2·0%, and at such a level most human communities are able to carry without undue difficulty the stresses imposed by old age.

By contrast, there were, in 1954, six countries whose population contained 10% or more of old people, and at this level the stresses of old age become matters of public concern. These countries were all in Western Europe — e.g. Belgium, Great Britain, France, and Sweden — but the process is becoming global. It is not without significance that Japan, the first of the Asian countries to embrace modern public health, now has two active societies devoted to the study of old age. Once started, the population change is progressive. Thus, in Great Britain the elderly had risen from 5% in the census of 1911 to about 7% in that of 1931, and are now probably around 12%. Not only is the tide rising, but the projections of the future suggest that this increase will continue at least until the 1980s. In many countries the internal structure of the population has been further changed by a simultaneous decline in birth rates. The smaller percentage of newborn causes the well-known bulge in the population pyramid and has social consequences of the utmost importance — it helps to account for the fact that in Great Britain some 25% of the old people are without children to care for them.

Definition of 'Old Age'

An essential factor in the approach to the title of this discussion is a definition of what we mean by 'old people'. In Great Britain old age begins at 60 for women and 65 for men, these being the ages at which individuals can obtain their contributory pensions. Nevertheless, these ages are devoid of biological significance, and there is a large body of evidence to suggest that old age begins later than this. The extraordinary degree of variation in the rate at which individuals age makes it very difficult to provide a satisfactory definition of old age.

Personally, I look on the period from 60 to 70 as being late middle age and not relevant to our discussion, and my remarks are devoted entirely to the period beyond the age of 70. Three points concerning this age group are of primary importance. In the first place it is now increasing with alarming rapidity — thus, in Great Britain, between 1935 and 1955 there was an increase of only 42% in women aged 65 - 69, compared with one of 132% in women of 85 and over. In the women's medical ward at the Royal Hospital, Wolverhampton, the proportion of the total admissions of women aged 70 and over rose from 3·9% in 1948 to 10·4% in 1957, and for the first half of 1959 was no less than 12%. This is probably the most important single factor in the general problem of old age

TABLE I. PERCENTAGE STRUCTURE OF OLD-AGE POPULATION OF GREAT BRITAIN

	Men		*Women*	
Year	*65 - 74*	*75 and over*	*65 - 74*	*75 and over*
1935	74·5	25·5	69·6	30·4
1955	67·9	32·1	63·8	36·2
1988	64·4	35·6	56·3	43·7
1998	63·0	37·0	54·1	45·9

and, as Table I shows, its relevance is likely to increase for another 30 years.

Factors Involved in Health in Old Age

From 1935 until the end of the century a steady increase is prophesied in the quota of old age contributed by those

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beyond the age of 75. In the second place, this age group contains a great preponderance of women for, as years increase, females steadily outnumber males, and although their mortality rates are less, all observers agree that their morbidity rates are higher than those of men. In the third place, many have only succeeded in attaining these advanced ages with the help of antibiotics to control their acute respiratory illnesses. Now they may ultimately succumb from illnesses whose duration of final incapacity is prolonged — such as cerebrovascular accidents, fractured femurs, or mental breakdown — which may call for prolonged support from the community, for the frailty of late old age may invalidate a technical recovery. The disproportionate increase in the number of those who are reaching the extremes of life is placing a considerable strain on the hospital, housing, and domestic facilities available for the care of old people in Great Britain. Nevertheless, there is more individual variation in old age than at any other period in life, and many aged people succeed in maintaining a life of independence virtually up to the end.

It is well to remember that the physical health in old age is influenced by two factors, which are of earlier origin and are essentially unalterable. One is the genetic constitution of the individual and the other is the sum total of his or her earlier life. Life insurance companies take quite an interest in both these points! Experimental evidence suggests, for instance, that a life of mild undernutrition may be more conducive to old age than one of overnutrition, but it would be quite useless to ask a younger individual to spend his adult life in avoiding the pleasures of appetite in order that he might have a slight persistence in duration towards the very end!

The period of old age is characterized by two further factors which, in the present state of knowledge, remain uncontrollable. There is an inevitable decline in the strength and flexibility of the body. It is not for nothing that athletes reach their prime earlier in life, and until one knows something about the inner nature of ageing it has to be accepted that the body in old age operates on a lower level both of immediate function and of reserve power than in earlier life. At the same time it is subject to degenerative conditions, such as arteriosclerosis and carcinoma, whose nature and control still remain elusive. I do not propose to say more about this aspect of old age, except to emphasize the profound importance of arterial disease. The therapeutics of old age, if restricted in scope by these considerations, can nevertheless be most valuable, and the demonstration that so much can be done by a policy of active treatment has been one of the main contributions to modern geriatrics. In my judgment, an overriding consideration here is the mental and moral vigour of the old person. What matters is that they should take an optimistic view of their condition, regardless of what one may term the medical or scientific truth. A remarkable demonstration of the practical importance of this point of view was found in the surveys of two random samples of old people carried out at Wolverhampton[3] and at Sheffield,[4] as shown in Table II.

TABLE II. MOBILITY AND ASSESSMENT OF FITNESS AS PERCENTAGE OF SAMPLE

Survey	*Unrestricted mobility*	*Self-assessment as fit*	*Physician's assessment as fit*
Sheffield: men	71·2	61·4	26·2
Wolverhampton: men	70·0		35·4
Sheffield: women	54·9	48·7	23·0
Wolverhampton: women	63·5		19·4

It will be seen that in both Sheffield and Wolverhampton, and for both men and women, the old people tended to rate their health as better than did the examining physician. It was for this reason that so many got about as much as they wanted in spite of adverse medical opinion as to their health. The following incident illustrates this point:

> Some years ago on an Atlantic passage I met an old man in the eighties who was travelling alone to visit his daughter, in spite of severe osteoarthritis in both hips. It appeared that his wife used to dress him, but when she died he had to fend for himself, so he fixed a peg in the wall to hold on to, and made a special pair of tongs which enabled him to put on and take off his socks and trousers. It is this refusal of so many old people to 'strike the flag', their deep determination to maintain their independence, that is so valuable.

Measures to Assist Independence in the Aged

In assisting them in this desire, four measures are of great practical importance:

1. In the first place I would stress the importance of adequate visual function. Old age is a period in which visual information becomes relatively more and more important, and it is also a period in which the peripheral receptors of vision are themselves subject to degeneration. I have no doubt whatever, that the greatest boon conferred on old people in Great Britain by the National Health Service has been the provision of adequate spectacles, for in 1948 I found that nearly one third were using spectacles that varied from inefficiency to positive harm.[3] I recommend any community that is anxious to maintain the health and efficiency of its old people to regard the care of their vision as being of quite fundamental importance, although, at the extremes of age, such conditions as cataract or senile degeneration of the macula may place a considerable strain on the hospital facilities.

2. In the second place, the provision of hearing aids is important, for a decline in auditory function is common in old age, and tends to affect men rather more than women. Deafness is an affliction which receives very little sympathy from the community, though it is a harassing complaint for the sufferer, and can have unfortunate social effects. Its relief by hearing aids has unquestionably proved of immense benefit to old people.

3. In the third place I regard the care of the feet as of profound practical importance. I do not know whether this is so important an aspect of ageing in South Africa as it is in Great Britain, where painful feet are the cause of much disability in old age, especially in women. Its relief is important since it is a local defect that can prevent individuals of otherwise considerable vigour from making an effective contribution to the life of the community. The provision of simple chiropody has been a great comfort and assistance to many old people in Great Britain, where the local authorities are now empowered to provide this service.

4. The fourth way in which we can help to maintain the physical efficiency of old people is by ensuring that they receive an adequate diet. One result of the proportionate

increase of old people within the population is social isolation, leading in many instances to their living alone. At the last census in 1951, no less than 917,000 out of a total of 6,663,000 old people, or 13·8%, were living alone. As a result of shopping and other difficulties, their diet may at times be reduced to such simple items as tea and bread and margarine, and they may never eat a reasonably sufficient diet. It has been found that the provision of adequate feeding (by a voluntary service that in England we call 'meals on wheels') has been of immense benefit, and it is astonishing how frequently restoration of an individual's nutrition will be accompanied by improvement in mental vigour. One should certainly add here the advisability of having a reasonable mouthful of teeth with which to chew.

Occupational Risks of Old Age

We are fortunate that such simple measures as those I have just outlined can be so successful in preserving the vigour of old people. There are, however, certain occupational risks of advancing years, in the forefront of which I would place a loss of postural stability, resulting in a liability to accidents and falls. A large proportion of fatal accidents in the house are due to falls in people over 65 and, although there are numerous reasons, they can be divided into fairly simple categories. One frequent cause is a purely accidental fall, resulting commonly from a surface made slippery by such factors as grease or winter snow and ice.

Another important group is falls on the stairs. One very curious finding among these is that one quarter are due to old people stepping off the bottom stair before actually reaching the floor.[5] This is something we must all of us have done at some time, but have usually succeeded in retaining our upright position. In old age this ability suddenly to retrieve a balance placed in jeopardy is lost and they fall. In fact, the remark that one commonly hears is "once you're going, you've got to go", a statement that conceals a fascinating problem in functional neuropathology. An interesting finding was that 10% of the fractured femurs I investigated were due to this type of fall, and it would seem that the violent muscular efforts involved in the attempt to regain balance were the probable cause of the fracture — the bone weakened by senile osteoporosis being unable to withstand such a severe muscular pull. Tripping over carpets and other minor projections is an important cause of falls, and seems to be due to a senile change in gait, which in many ways is reminiscent of parkinsonism.

The single most common type of fall, which accounts for one quarter of all falls in old people, is the 'drop attack', in which an individual suddenly falls to the ground without loss of consciousness. A typical instance was that of an old lady of 86 who at one moment was peeling potatoes at her sink, and at the next moment found herself on the floor with a potato in one hand and the knife in the other. The origin of these attacks is obscure, but it has been suggested that they may be based on transient changes in blood supply to the brain stem.[6] Half the old people suffering from these attacks were unable to throw their heads back, or to work with their hands above their heads, without developing giddiness or other symptoms. The frequency of this disability in normal old age is unknown, but it is certainly considerable, and I am convinced it is a most important factor, though its importance is not usually recognized.

Although it might have a labyrinthine origin, it seems most likely that obstruction to the blood flow in the vertebral artery may be the operative factor. This will help to explain the frequency of vertigo in advanced years, which is a direct cause of some falls, and a contributory factor in many more. It is likely that this vertigo is central in origin, probably owing to temporary ischaemic changes in the vestibular nuclei and other centres in the brain stem. Osteoarthritis of the cervical spine is very common with advancing years, and can cause displacement of the vertebral artery, and it is thought that extension of the neck may so aggravate this as to lead to temporary 'kinking' with obstruction to the flow of blood, which may in turn precipitate a drop attack. At any rate I feel certain that there are many old people to whom extension of the neck is potentially dangerous, and a posture to be avoided. It is a posture adopted in numerous domestic situations, such as hanging washing on the line, replacing an electric light bulb, or reaching to the top shelf in a cupboard — which should certainly be eschewed by susceptible old people. If it is true that a man is as old as his arteries, I would go on to ask 'which arteries?', and would unhesitatingly reply 'the two carotids, the two vertebrals and the basilar'. This difficulty in extension of the neck may be one facet of their importance. The extraordinary retention of mental power into advanced years shown by some individuals may turn out to be based on an unusual retention of an open and unimpeded vascular supply to the brain.

Mental Aspects of Old Age

To regard health as a purely physical problem would be to rob man of his essential nature, and it is necessary to consider both the mental and the social life of old people and their repercussions on health. We have some knowledge both of the cerebral changes that accompany ageing and of the effects of ageing on mental performance, though we are only on the threshold of the subject. Ageing seems to be accompanied by a loss of nerve cells from the brain and nervous system. Whether this is intrinsic to the process of chronological ageing or is based in turn on defects in vascular supply is unknown. The brain in the normal individual contains an astronomical number of nerve cells — 10 - 12,000 million — and this number is clear evidence that sheer quantity is important. Not only does age present a neurocellular deficit, but abnormal staining reactions of ageing neurones have suggested a deficient enzyme content.[7]

A slowing of reaction times and a defect in recent memory seem to be fundamental to the ageing process and, although the physical basis of memory is unknown, certain views have been put forward which are not without interest. A shortage of nerve cells could mean no more than that the machine in old age is no longer big enough to stand up to the work required. A more intriguing explanation, however, which has obtained considerable support from the experimental psychologists, is derived from modern information and the theory is based on the concept of 'neural noise'.[8] Electroencephalography reveals

intrinsic rhythmic activities of the brain on which the pattern of incoming signals is received.

It may be that one reason why such enormous numbers of nerve cells are required is that they alone can effect a statistical analysis to separate signals conveying information from a background of neural activity. The importance of this may well increase in inverse ratio to the strength of the signal, weak signals tending to become indistinguishable from a background of neural noise. A useful analogy here I think is that of the modern radio-telescopes, whose findings may have to be fed into a computor so that significant patterns can be separated from a background of extraneous activities, such as those produced by wireless. Some such explanation helps to provide an approach to the mystery of the numerical magnitudes concerned, a good example of which is provided by the Purkinje cells of the cerebellum, which amount to some 14 million. The effect of a reduction of cells would be to reduce the capacity of the brain to achieve this separation, and at the same time the presence of cells with an abnormal metabolism might well lead to the production of a bigger volume of random signals than normal; the combined effect of which would be to swamp incoming signals in a background of 'neural noise'. This is a very suggestive theory, and one cannot but feel that the study of old age may help to throw light on the physiology of normal cerebral function. I do not think that the importance of this aspect of gerontology is sufficiently realized — for, as I have said elsewhere, at this stage of life Nature resembles the engineer who may release the unexpected when he tests his materials to destruction.

There can be no doubt as to this reduction of functional capacity in old age, and the failure of recent memory shows itself in many practical situations.

Two examples we have all seen are the way Grandma loses her spectacles, and the well-known behaviour of the ageing man who repeats stories and incidents which he has already recounted on a number of previous occasions. These may not be very important, but in Great Britain there is an increasing mortality among old people from gas poisoning in the home, owing, not to suicide, but simply to the failure of recent memory causing them to forget to light the gas after turning it on. There has, in consequence, been considerable activity in the attempt to produce gas stoves fitted with automatic safety devices.

The decline in so-called 'channel capacity' may have the further effect of making it difficult to accommodate new signals while a previous movement is being monitored. To effect a complicated movement an old person may find it necessary to programme the sequence in advance — rather like a railway signalman who controls a traffic movement by a pre-set of his points and signals — and once started the movement is apt to be carried out without regard to contemporary sensory input. I am already conscious of this myself, in such a movement as getting on a bicycle by swinging one's leg over the saddle. This may be the cause of some traffic accidents to aged pedestrians who, having decided it safe to cross a road, may proceed to do so, irrespective of traffic movements subsequent to their original decision. The making of such a decision resembles the laying and firing of an anti-aircraft gun, the problems posed to the predictor of the gun and the brain of the individual being identical. The individual needs to know on the one hand the speed, the present position, and the direction of movement of an oncoming vehicle, and on the other hand his own position and possible speed and direction of movement. The answer — which is reached unconsciously — is whether it is safe to cross the road, and if so, whether at a walk or a run. With old people this problem may fully occupy or even overload the lessened number of nerve cells available, so that not only may the decision take longer, but its very formation may block the receipt of contemporary sensory information as to the state of traffic.

When channel capacity is overloaded there is also apt to be an overspill of neural tension into the emotional centres. This may be the reason why old gentlemen are sometimes said to be 'peppery'. The ageing individual whose capacities are fully occupied in the performance of one activity and who is then suddenly interrupted or asked an irrelevant question, is apt to explode in wrath. This is probably a reflection of the failure of the machine to keep up with the demands of the environment and considerable latitude has to be allowed to ageing people in this respect.

In the sharpest contrast to this failure of recent memory stands the almost incredible power of early memories, and indeed at the very end of a very long life this may be almost the only mental capacity that is retained. The reasons are unknown, but it may well be related to the interesting phenomenon in birds known as 'imprinting', in which the initial sensory signals after hatching may have a permanent control over subsequent behaviour. Thus, if newly hatched goslings see a human being before they see their own parents, they will subsequently prefer to follow this individual. These findings imply that the earliest sensory signals to be received produce permanent effects on cerebral structure, and the persistence of childhood memory into old age may well reflect the same process, though whether this operates at the molecular, the macromolecular, or the cellular level remains unknown. It is quite useless to attempt to deter old people from reliving their life of the past, for it is, to a large extent, their present life.

Social Aspects of Old Age

Here I wish to stress the fact that man is a social animal, and that a satisfactory integration with other human beings is one aspect of normal mental health. Social integration is apt to be in peril in old age, and severe loneliness is not only one of the most pitiful hazards of the ageing process, but its effects on mental and physical vigour can be most adverse. Measures directed towards the relief of loneliness afford one of the most vital aspects of care for old people. Indeed, the active growth of 'visiting' services has probably been the major characteristic of the social care of the elderly in the last decade.

A further hazard to robust mental health in old age is a sense of uselessness, and this has been considerably increased by the fact that, although we live in an age in which the expectation of life has been increased, society has, at the same time, increasingly developed the habit of retirement at a fixed birthday. Men, in particular, tend to be the victims of this process, and at the moment much thought is being given to the possibilities of education in preparation for the problems of retirement. These two

mental states — loneliness and uselessness — can have a profound influence on the health of old people, for they are inhibitory of that mental vigour and gusto the importance of which I have already stressed.

Advice to Old People

Finally, let me add that the care of old age is peculiar in that almost invariably those concerned have themselves no instinctive knowledge of this period of life, since they have not yet reached it. It is well to remember this fact and to those who are interested I commend the masterly address given by the late Miss Margery Fry on the occasion of the Third International Congress of Gerontology in London in 1954.[9] Advice given by the young to the elderly is almost invariably — and often wrongly — in the direction of caution. You may remember the poem of the Caterpillar in *Alice in Wonderland*:

> "You are old, Father William," the young man said,
> "And your hair has become very white;
> And yet you incessantly stand on your head —
> Do you think, at your age, it is right?"

There are two points of view here, and there is much to be said for both. Speaking as an old man, if I could enjoy standing on my head with the impunity the verse suggests, I should certainly listen to the young man, but go on doing what I wanted!

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